Appendix B

2003 Environmental Monitoring Program

The WVDP Supports a Bluebird and Wood Duck Nesting-Box Program Sponsored by the Springville Field and Stream Club

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2003 Environmental Monitoring Program

The following schedule represents the West Valley Demonstration Project (WVDP) routine environmental monitoring program for 2003. This schedule met or exceeded the requirements of DOE Order 450.1, DOE Order 5400.5, and DOE/EH-0173T. Specific methods and recommended monitoring program elements are found in DOE/EP-0096, *A Guide for Effluent Radiological Measurements at DOE Installations*, and DOE/EP-0023, *A Guide for Environmental Radiological Surveillance at U.S. Department of Energy Installations*, which were the bases for selecting most of the schedule specifics. Additional monitoring was mandated by air and water discharge permits (40 CFR 61 and SPDES), which also required formal reports. Specifics are identified in the schedule under Monitoring/Reporting Requirements.

A computerized environmental data-screening system identifies analytical data that exceed pre-set limits. All locations are checked monthly for trends or notable results in accordance with criteria established in *Documentation and Reporting of Environmental Monitoring Data* (West Valley Nuclear Services Co., March 26, 2003). Reportable results are then described in a Monthly Trend Analysis Report (MTAR) together with possible causes and corrective actions, if indicated. A WVDP Effluent Summary Report (ESR) is transmitted with each MTAR.

Schedule of Environmental Sampling

The index on pages B-vi through B-viii is a list of the codes used to identify the various sampling locations, which are shown on Figures A-1 through A-13 (pp. A-1 through A-13 in Appendix A). The schedule of environmental sampling at the WVDP is found in this appendix on pages B-1 through B-52. Table headings in the schedule are as follows:

• ***Sample Location Code.*** Describes the physical location where the sample is collected. The code consists of seven or eight characters: The first character identifies the sample medium as **A**ir, **W**ater, **S**oil/**S**ediment, **B**iological, or **D**irect Measurement. The second character specifies o**N**-site or o**F**f-site. The remaining characters describe the specific location (e.g., **AFGRVAL** is **A**ir o**F**f-site at **GR**eat **VAL**ley). Distances noted at sampling locations are as measured in a straight line from the main stack on-site.

• ***Monitoring/Reporting Requirements.*** Notes the bases for monitoring the location, any additional references to permits, and the reports that are generated from the sample data. Routine reports cited in this appendix are the Effluent Summary Report (ESR), the Monthly Trend Analysis Report (MTAR), the State Pollutant Discharge Elimination System Discharge Monitoring Report (SPDES DMR), the Air Emissions Report (NESHAP), and the Annual Site Environmental Report (ASER).

• ***Sampling Type/Medium.*** Describes the collection method and the physical characteristics of the medium.

• ***Collection Frequency.*** Indicates how often the samples are collected or retrieved.

• ***Total Annual Sample Collections.*** Specifies the number of discrete physical samples collected annually for each group of analytes.

• ***Analyses Performed/Composite Frequency.*** Notes the type of analyses of the samples taken at each collection, the frequency of composite, and the analytes determined for the composite samples.

Summary of Monitoring Program Changes in 2003

Location Code	Description of Changes
ANSEISK	Sampling at ANSEISK, backup for the vitrification facility heating, ventilation, and air-conditioning system, was discontinued in March 2003. (The sampling system at ANSEISK was retained and is now the sampler of record at location ANVITSK.)
ANLLW2V	Sample collection was discontinued in March 2003 at the end of the 1st quarter. No releases higher than background have been noted at this location in more than thirteen years of monitoring. Releases may be estimated using process knowledge.
WNSP006 WFBCBKG WFBCTCB	The parameter list for nonradiological analyses was modified from a groundwater-oriented program to a surface-water-oriented program. Analyses were added to assess compliance with New York Water Quality Standards for Class C Waters.
WNSP007	Strontium-90 analysis of sanitary waste discharge samples was added on a quarterly basis beginning with the second quarter of 2003.
WNSWAMP WNSW74A	The parameter list for nonradiological analyses was modified from a groundwater-oriented program to a surface-water-oriented program in order to define ambient conditions at these outfalls.
WNSP005 WNERB53 WNFRC67	Strontium-90 and gamma-isotopic analyses were added on a quarterly basis beginning with the second quarter of 2003.
WNCOOLW	Sampling of cooling water from plant systems was reduced from monthly to quarterly and strontium-90 analysis was added beginning with the second quarter of 2003.
WNSTAW Series	Strontium-90 and gamma-isotopic analyses were added on an annual basis.

Summary of Monitoring Program Changes in 2003 (concluded)

Location Code	Description of Changes
WNDNKEL WNDNKMP WNDNKMS	Beginning in the second quarter of 2003, sampling frequency for these potable water locations was reduced from monthly to every third month, on a rotating basis. (Full monthly and annual sampling was retained at the entry point for site potable water, WNDNKUR.)
WFBCTCB WFFELBR	Technetium-99 analysis was added on a quarterly basis, beginning with the second quarter of 2003.
WFWEL01 through WFWEL10	Strontium-90 analysis was added on an annual basis.
AFNASHV SFNASHV	Air and soil sampling at the secondary background location (Nashville) was discontinued at the end of the 1st quarter of 2003, in March. (The primary background location, Great Valley, was retained.)
BFFCATC BFFCTRL	The number of fish collected at each location was reduced from ten to five for each sampling period in consideration of safety of field sampling personnel and to reduce pressure on the fish population. Statistical assessment indicated that this reduction does not impact the ability to evaluate radionuclide concentrations in fish.
BFMCTLN	Sampling for milk was discontinued at the northern background location at the end of the 1st quarter of 2003, in March. (The southern background location is still being sampled.)
BFHCTLN BFHCTLS BFHNEAR	Sampling of hay was deleted from the program. Data from these samples are not directly used in dose estimates.
DFTLD17 DFTLD37 DFTLD41	Redundant background thermoluminescent dosimeter (TLD) locations at Five-Points Landfill (DFTLD17), Nashville (DFTLD37), and Sardinia (DFTLD41) were deleted from the program after the 1st quarter of 2003, in March. The primary background location at Great Valley was retained.

Index of Environmental Monitoring Program Sample Points

Air Effluent and On-Site Ambient Air (Fig. A-4 [p. A-4])

Liquid Effluent and On-Site Water (Fig. A-2 [p. A-2])

* *Not detailed on map.*

Index of Environmental Monitoring Program Sample Points (continued)

On-Site Groundwater and Seeps (Figs. A-6 through A-8 [pp. A-6 through A-8])

Off-Site Surface Water (Fig. A-3 [p. A-3])

Off-Site Drinking Water (Figs. A-9, A-12, and A-13 [pp. A-9, A-12, and A-13])

Off-Site Ambient Air (Figs. A-5, A-12, and A-13 [pp. A-5, A-12, and A-13])

Index of Environmental Monitoring Program Sample Points (concluded)

Fallout, Sediment, and Soil (Figs. A-2 through A-5 [pp. A-2 through A-5], A-12, and A-13 [pp. A-12 and A-13])

Off-Site Biological (Figs. A-9, A-12, and A-13 [pp. A-9, A-12, and A-13])

Direct Measurement Dosimetry (Figs. A-10 through A-13 [pp. A-10 through A-13])

* Near-site and background produce samples (corn, apples, and beans) are identified specifically as follows: corn = **BFVNEAC** and **BFVCTRC**; apples = **BFVNEAAF** and **BFVCTRA**; beans = **BFVNEAB** and **BFVCTRB**.

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2003 Monitoring Program
On-Site Effluent Monitoring

Air Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
ANSTACK *Main Plant Ventilation Exhaust Stack* **ANSTSTK** *Supernatant Treatment System (STS) Ventilation Exhaust* **ANCSSTK** *01-14 Building Ventilation Exhaust* **ANCSRFK** *Contact Size-Reduction Facility Exhaust* **ANCSPFK** *Container Sorting and Packaging Facility Exhaust* **ANVITSK** *Vitrification HVAC Exhaust*	Airborne radioactive effluent points, including the LWTS Required by: • 40 CFR 61 Reported in: • ESR • MTAR • ASER • Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate monitors	Continuous measurement of fixed filter; replaced weekly	NA	Real-time alpha and beta monitoring
		Continuous off-line air particulate filters	Weekly	52 each location	Gross alpha/beta, gamma isotopic* upon collection, flow
				Weekly filters composited to 4 each location	Quarterly composites for Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, gamma isotopic, flow
		Continuous off-line desiccant columns for water vapor collection	Weekly	52 at each of two locations	H-3 (**ANSTACK** and **ANSTSTK** only), flow
		Continuous off-line charcoal cartridges	Weekly	Weekly cartridges composited to 4 each location	Quarterly composite for I-129
ANSEISK *Seismic Sampler, Vitrification Backup*	Airborne radioactive effluent point Required by: • 40 CFR 61 Reported in: • ESR • MTAR • ASER	Continuous off-line air particulate filter	Weekly	13**	Filters for gross alpha/ beta, gamma isotopic* upon collection, flow

* Weekly gamma isotopic only if gross activity rises significantly.
** Sampling at ANSEISK was discontinued after the first quarter of 2003, so only 13 samples were collected.
NA - Not applicable.

Sampling Rationale

ANSTACK DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from most process areas, including cell ventilation, vessel off-gas, fuel receiving and storage (FRS), head end ventilation, and an analytical aisle. Requires continuous effluent monitoring per 40 CFR Subpart H, Section 61.93(b) because potential emissions may exceed the 0.1 mrem limit.

ANSTSTK DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation (permanent ventilation system [PVS]) from building areas involved in treatment of high-level waste supernatant. Requires continuous effluent monitoring per 40 CFR Subpart H, Section 61.93(b) because potential emissions may exceed the 0.1 mrem limit.

ANCSSTK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from the 01-14 building, which houses equipment used to treat the ceramic melter off-gas. Requires effluent monitoring per 40 CFR Subpart H, Section 61.93(b) to confirm that emissions are less than the 0.1 mrem limit.

ANCSRFK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Monitors and samples HEPA-filtered ventilation from a process area where radioactive tanks, pipes, and other equipment are cut up with a plasma torch to reduce volume.

ANCSPFK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Monitors and samples ventilation from lag storage area 4, the container sorting and packaging facility.

ANVITSK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Vitrification facility heating, ventilation, and air conditioning (HVAC) effluent exhaust stack. Sampler brought on-line in late 1995 when nonradioactive operations began. Radioactive operation began with the first high-level waste transfer in June 1996 and vitrification startup in July 1996. Monitors and samples HEPA-filtered ventilation from building areas involved in treatment of high-level waste supernatant. Requires effluent monitoring per 40 CFR Subpart H, Section 61.93(b) because potential emissions may exceed the 0.1 mrem limit.

ANSEISK DOE/EH-0173T, 3.0; DOE-EP-0096, 3.3

Vitrification system back-up filter for catastrophic-event monitoring in case the primary vitrification HVAC stack ventilation fails. Since vitrification was completed, backup sampling was discontinued. The sampling equipment from ANVITSK and ANSEISK draw air from the same emission point. Sample point ANSEISK was deleted from the monitoring program after the first quarter of 2003. However, since the sampling equipment formerly used as the seismic sampler (ANSEISK) is more accessible for maintenance and sample changing, the equipment was returned to service as ANVITSK, the sampler of record, in October 2003.

n Sampling locations are shown on Figure A-4 (p. A-4).

2003 Monitoring Program
On-Site Effluent Monitoring

Air Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
OVEs/PVUs *Outdoor Ventilated Enclsoures/Portable Ventilation Units*	Airborne radioactive effluent points Required by: • 40 CFR 61 Reported in: • ESR • MTAR • ASER • Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate filter	→ As required	→ 1 each location	→ Filters for gross alpha/ beta, gamma isotopic* upon collection, flow
				Collected filters** composited to 4	→ Quarterly composites for Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, gamma isotopic, flow

* Gamma isotopic only if gross activity rises significantly.

** If gross determination of individual filter is significantly higher than background, the individual sample would be submitted immediately for isotopic analysis.

Sampling Rationale

OVEs/PVUs DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Outdoor ventilated enclosures; portable ventilation units used for handling radioactive materials or for decontamination in areas not having containment ventilation. Emissions are monitored to confirm that they are below the 0.1 mrem limit.

n Sampling locations are not shown on figures.

2003 Monitoring Program
On-Site Effluent Monitoring

Air Effluents and On-Site Ambient Air

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
ANLLW2V *Low-Level Waste Treatment and Ventilation (New Facility)*	Airborne radioactive effluent point Required by: • 40 CFR 61 Reported in: • ESR • MTAR • ASER • Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate filter	→ Monthly	→ 3*	→ Gross alpha/beta, gamma isotopic** upon collection, flow
ANLAGAM *Lag Storage Area Ambient Air* **ANNDAAM** *NDA Ambient Air*	Ambient "diffuse source" air emissions Reported in: • MTAR • ASER	Continuous air particulate filter	→ Weekly	→ 52 each location	→ Gross alpha/beta, flow
				Weekly filter composited to 4 each location	→ Quarterly composites for Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241, gamma isotopic, flow
ANSDAT9*** *SDA Trench 9 Ambient Air*	Ambient "diffuse source" air emissions Reported in: • MTAR • ASER • Reported to NYSERDA	Continuous air particulate filter	→ Weekly	→ 52	→ Gross alpha/beta, flow
				Weekly filter composited to 4	→ Quarterly composite for gamma isotopic, flow
		Continuous off-line desiccant columns for water vapor collection	→ Weekly	→ 52	→ H-3, flow
		Continuous off-line charcoal cartridges	→ Monthly	→ Monthly cartridges composited to 4	→ Quarterly composite for I-129, flow

* Sampling at ANLLW2V was discontinued after the first quarter of 2003, so only three samples were collected.
** Gamma isotopic only if gross activity rises significantly.
*** Sampling frequency and analytical parameters as directed by NYSERDA.

Sampling Rationale

ANLLW2V DOE/EH-0173T, 3.0; DOE/EP-0096, 3.3

Samples ventilation exhaust from the new low-level waste treatment facility. System started up in April 1998. Sampling was discontinued at the end of the 1st quarter of 2003, in March.

ANLAGAM DOE/EH-0173T, 3.3.2

Monitors ambient air in the lag storage area, a possible diffuse source of air emissions.

ANNDAAM DOE/EH-0173T, 3.3.2

Monitors ambient air in the NDA area, a possible diffuse source of air emissions.

ANSDAT9 DOE/EH-0173T, 3.3.2

Monitors potential diffuse sources of air emissions at the SDA and south plateau area. WVDP support of NYSERDA.

n Sampling locations are shown on Figure A-4 (p. A-4).

2003 Monitoring Program
On-Site Effluent Monitoring

Liquid Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP001 *Lagoon 3 Discharge Weir*	Primary point of liquid effluent batch release Required by: • SPDES permit Reported in: • Monthly SPDES DMR • ESR • MTAR • ASER	Grab liquid	Daily, during lagoon 3 discharge*	24-56	Daily for gross beta, conductivity, flow
				12-24	Near the start, middle, and end of each discharge, a sample is analyzed for gross alpha/beta, H-3, Sr-90, gamma isotopic
				Composite of daily samples for each discharge, 4-8	Weighted composite for gross alpha/beta, H-3, C-14, Sr-90, Tc-99, I-129, gamma isotopic, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, and Am-241 for each month of discharge
		Composite liquid	Twice during discharge, near start and near end	8-16	Two 24-hour composites for BOD_5, total suspended solids, SO_4, NO_3-N, NO_2-N, NH_3, total Al, Fe, Hg, and Mn, total recoverable Cd, Cr, Cu, Ni, Pb, and Zn, dissolved As and Cu, dissolved sulfide
		Grab liquid	Twice during discharge, near start and near end	8-16	Settleable solids, total dissolved solids, pH, cyanide amenable to chlorination, oil & grease, surfactant (as LAS), total recoverable Co, Cr^{+6}, Se, and V, 3,3-dichlorobenzidine, tributyl phosphate, hexachloro-benzene, alpha-BHC, heptachlor, xylene, 2-butanone
		Composite liquid	Quarterly**	8	A 24-hour composite for bromide and boron
		Composite liquid	Semiannual**	4	A 24-hour composite for titanium
		Composite liquid	Annual**	2	A 24-hour composite for Ba and Sb
		Grab liquid	Semiannual**	4	Bis(2-ethylhexyl) phthalate, 4-dodecene
		Grab liquid	Annual**	2	Chloroform, dichlorodi-fluoromethane, trichlorofluoromethane

* Lagoon 3 is discharged four to eight times per year, as necessary, averaging six to seven days per discharge.
** Two samples are collected, one near the start and one near the end of the discharge.

Sampling Rationale

WNSP001 DOE Order 5400.5; DOE/EH-0173T, 2.3.3; New York State SPDES Permit no. NY0000973

By DOE Order all liquid effluent streams from DOE facilities shall be evaluated and their potential for release of radionuclides addressed. These requirements for radiological parameters are met by daily grab sampling during periods of lagoon 3 discharge.

Sampling for chemical constituents is performed near the beginning and end of each discharge period to meet the site SPDES Permit. Both grab samples and 24-hour composite samples are collected.

For permit requirements, total Hg is analyzed by U.S. EPA Method 245.1. For mercury studies, samples are analyzed by EPA Method 1631.

n Sampling location is shown on Figure A-2 (p. A-2).

2003 Monitoring Program
On-Site Effluent Monitoring

Liquid Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP01B *Internal Process Monitoring Point*	Internal point for monitoring Hg at effluent of the Hg pretreatment process Required by: • SPDES Permit Reported in: • Monthly SPDES DMR	Continuous	Weekly	NA	Flow
		Continuous	Monthly	NA	Flow time
		Composite liquid	Twice per month when operating	24	Total Hg
WNSP116 *Pseudo-Monitoring Point Outfall 116*	Calculated concentration of dissolved solids at pseudo-monitoring point in Frank's Creek. Based upon TDS at WNSP001, WNSP006, and augmentation water. Required by: • SPDES Permit Reported in: • Monthly SPDES DMR	Calculated	Twice per discharge event	8-16	Total dissolved solids

NA - Not applicable

Sampling Rationale

WNSP01B New York State SPDES Permit no. NY0000973

This internal point is used to monitor mercury in effluent from the proposed mercury pretreatment process. Effluent from this point is subsequently released to lagoon 3, which is monitored at point WNSP001.

For permit requirements, total Hg is analyzed by U.S. EPA Method 245.1. For mercury studies, samples are analyzed by EPA Method 1631.

WNSP116 New York State SPDES Permit no. NY0000973

This "pseudo-monitoring point," assumed to be in Frank's Creek, is calculated from actual total dissolved solids (TDS) measurements and flow measurements from points WNSP001 and WNSP006 and from augmentation water.

n Sampling location WNSP116 is shown on Figure A-2 (p. A-2). Sampling location WNSP01B is not shown on the figures.

2003 Monitoring Program
On-Site Effluent Monitoring

Liquid Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP006 *Frank's Creek at the Security Fence*	Combined facility liquid discharge Required by: • SPDES Permit Reported in: • Monthly SPDES DMR • MTAR • ASER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90 (shared with NYSDOH)
				Weekly samples composited to 4	Quarterly composite for C-14, Tc-99, I-129, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Grab liquid	Four per discharge, before start, near start, near end, and after end	16-32	TDS
		Grab liquid	Monthly	12	Hardness (Ca and Mg)
		Grab liquid	Semiannual*	2	Temperature (field), pH (field), dissolved oxygen (field), TOX, oil and grease
		Grab liquid	Semiannual*	2	TSS, NPOC, NH_3 (as N), NO_3 (as N), NO_2 (as N), bromide, fluoride, chloride, sulfate, total sulfide, surfactant (as LAS), alpha-BHC, B, Ba, Co, Fe, Na, Mn, Sb, Ti, Tl, V, dissolved Al, As, Cd, Cr, Cu, Hg (method 1631), Ni, Pb, Se, Zn
WNURRAW *Utility Room Raw Water*	Source water Required by: • SPDES Permit Reported in: • Monthly SPDES DMR	Composite liquid	Weekly	52	Total Fe
		Grab liquid	Three per discharge, before start, near start, and near end	12-24	TDS
		Grab liquid	Monthly	12	TOC, alkalinity
		Grab liquid	Quarterly	4	Giardia, cryptosporidium, heterotrophic bacteria

* Semiannual samples collected when points WNSP001 and WNSP007 are discharging.

Sampling Rationale

WNSP006 DOE/EH-0173T, 5.10.1.1; New York State SPDES Permit no. NY0000973; 6 NYCRR, Parts 702–704

By DOE Order all liquid effluent streams from DOE facilities shall be evaluated and their potential for release of radionuclides addressed.

The monitoring program on the facing page was put into place at the end of March 2003.

The parameter list for nonradiological analyses was modified in 2003 from a groundwater-oriented program to a surface-water-oriented program. Analyses were added to ensure compliance with New York State Water Quality Standards for Class C Waters.

TDS is measured before the discharge begins, shortly after it begins, near the end, and after the end of each lagoon 3 discharge period to meet requirements of the site SPDES Permit. Measurements of TDS and flow are used to calculate TDS at pseudo-monitoring point outfall 116 in Frank's Creek.

Semiannual samples are collected when WNSP001 and WNSP007 are discharging.

WNURRAW New York State SPDES Permit no. NY0000973; 10 NYCRR, Part 5, Subpart 5-1

TDS is measured near the beginning and end of each lagoon 3 discharge. Results are used for outfall 116 calculations. (See **WNSP006** above.)

n Sampling location WNSP006 is shown on Figure A-2 (p. A-2). Sampling location WNURRAW is not shown on the figures.

2003 Monitoring Program
On-Site Effluent Monitoring

Liquid Effluents

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP007 *Sanitary Waste Discharge*	Liquid effluent point for sanitary and utility plant combined discharge Required by: • SPDES Permit Reported in: • Monthly SPDES DMR • ESR • MTAR • ASER	24-hour composite liquid	→ 3 each month	→ 36	→ Gross alpha/beta, H-3, pH, total suspended solids, NH_3, NO_2-N, BOD_5, total Fe, flow
				Monthly samples composited to 4	→ Quarterly composite for gamma isotopic and Sr-90
		Grab liquid	→ 3 each month	→ 36	→ Oil & grease
		Grab liquid	→ Weekly	→ 52	→ pH, settleable solids, total residual chlorine, temperature
		Grab liquid	→ Annual	→ 1	→ Chloroform
		Grab liquid	→ Monthly	→ 12	→ Flow, flow time

Sampling Rationale

WNSP007 DOE Order 5400.5; DOE/EH-0173T, 2.3.3; New York State SPDES Permit no. NY0000973

Monitoring of treated effluent from the sanitary and industrial wastewater treatment facility is performed in accordance with the New York State SPDES Permit no. NY0000973 and DOE Order 5400.5 criteria.

Strontium-90 analysis was added in a quarterly basis beginning in the 2nd quarter of 2003.

n Sampling location WNSP007 is shown on Figure A-2 (p. A-2).

2003 Monitoring Program
Environmental Surveillance

On-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSWAMP *Northeast Swamp Drainage*	Site surface drainage Reported in: • ESR • MTAR • ASER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3, flow
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90 (shared with NYSDOH)
				Weekly samples composited to 4	Quarterly composite for C-14, I-129, U-232, U-233/234,U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Grab liquid	Semiannual*	2	Temperature (field), pH (field), TOX, oil and grease
		24-hour timed continuous composite	Semiannual*	2	TSS, TDS, NPOC, NH_3, (as N), NO_3 (as N), NO_2 (as N), bromide, fluoride, sulfate, total sulfide, surfactant (as LAS), alpha-BHC, hardness (Ca and Mg), total Al, B, Cd, Co, Cr, Cu, Fe, Hg (method 1631), Mn, Ni, Pb, Sb, Se, Ti, Tl, V, Zn, dissolved As, Cu
WNSW74A *North Swamp Drainage*	Site surface drainage Reported in: • ESR • MTAR • ASER	Timed continuous composite liquid	Weekly	52	Gross alpha/beta, H-3
				Weekly samples composited to 12	Monthly composite for gamma isotopic and Sr-90
				Weekly samples composited to 4	Quarterly composite for C-14, I-129, U-232, U-233/234,U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Grab liquid	Semiannual*	2	Temperature (field), pH (field), TOX, oil and grease
		24-hour timed continuous composite	Semiannual*	2	TSS, TDS, NPOC, NH_3 (as N), NO_3 (as N), NO_2 (as N), bromide, fluoride, sulfate, total sulfide, surfactant (as LAS), alpha-BHC, hardness (Ca and Mg), total Al, B, Cd, Co, Cr, Cu, Fe, Hg (method 1631), Mn, Ni, Pb, Sb, Se, Ti, Tl, V, Zn, dissolved As, Cu

* Sampled during ambient (i.e., non-wet weather) conditions.

Sampling Rationale

WNSWAMP DOE/EH-0173T, 5.10.1.1; 40 CFR, Part 122.26

Northeast site surface water drainage; provides for sampling of uncontrolled surface waters from this discrete drainage path just before they leave the site's controlled boundary. Waters represent surface and subsurface drainages from the construction and demolition debris landfill (CDDL), old hardstand areas, and other possible north plateau sources of radiological or nonradiological contamination on the north plateau.

The monitoring program on the facing page was put into place at the end of the first quarter of 2003, in March. The parameter list for nonradiological analyses was modified from a groundwater-oriented program to a surface-water-oriented program in order to define ambient conditions at these outfalls.

Monitoring for nonradiological parameters is performed during ambient conditions to verify authorized non-storm water flows. Storm water monitoring is performed per WVDP-233, "Sampling and Analysis Plan for Storm Water Discharges at the West Valley Demonstration Project."

WNSW74A DOE/EH-0173T, 5.10.1.1; 40 CFR, Part 122.26

North site surface water drainage; provides for sampling of uncontrolled surface waters from this discrete drainage path just before they leave the site's controlled boundary. Waters represent surface and subsurface drainages from lag storage areas and other possible sources of radiological or nonradiological contamination on the north plateau.

The monitoring program on the facing page was put into place at the end of the first quarter of 2003, in March. The parameter list for nonradiological analyses was modified from a groundwater-oriented program to a surface-water-oriented program in order to define ambient conditions at these outfalls.

Monitoring for nonradiological parameters is performed during ambient conditions to verify authorized non-storm water flows. Storm water monitoring is performed per WVDP-233, "Sampling and Analysis Plan for Storm Water Discharges at the West Valley Demonstration Project."

n Sampling locations are shown on Figure A-2 (p. A-2).

2003 Monitoring Program
Environmental Surveillance

On-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSDADR *SDA Run-Off*	Surface water run-off from south portion of SDA Required by: • Interim Measures Compliance Reported in: • MTAR • ASER • Reported to NYSERDA	Grab liquid	Monthly	12 maximum	pH, total suspended solids, oil & grease, flow, gross alpha/beta, H-3, gamma isotopic, precipitation

WNSDADR NYSERDA interim measures compliance.

- Sampling location WNSDADR is shown on Figure A-2 (p. A-2).

2003 Monitoring Program
Environmental Surveillance

On-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSP008* *French Drain*	Drains subsurface water from LLWTF lagoon area Required by: • SPDES Permit Reported in: • Monthly SPDES DMR • ESR • MTAR • ASER	Grab liquid	Monthly	12	Gross alpha/beta, H-3
		Grab liquid	3 each month	36	Conductivity, pH, BOD_5, total Fe, total recoverable Cd and Pb, flow
		Grab liquid	Annual	1	As, Cr, total Ag, and Zn
WNSP005 *Facility Yard Drainage*	Combined drainage from facility yard area Reported in: • MTAR • ASER	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
				Monthly samples composited to 4	Quarterly composite for gamma isotopic and Sr-90
WNCOOLW *Cooling Tower Basin*	Cools plant utility steam system water Reported in: • MTAR • ASER	Grab liquid	Quarterly	4	Gross alpha/beta, H-3, gamma isotopic, Sr-90, pH

* Although WNSP008 is listed in the SPDES Permit, it was capped off in May 2001 and is no longer being sampled.

Sampling Rationale

WNSP008 DOE/EH-0173T, 5.10.1.3; New York State SPDES Permit no. NY0000973

French drain of subsurface water from lagoon (LLWTF) area. The SPDES Permit also provides for sampling of uncontrolled subsurface water from this discrete drainage path before these waters flow into Erdman Brook. Waters represent subsurface drainages from downward infiltration around the LLWTF and lagoon systems. This point would also monitor any subsurface spillover from the overfilling of lagoons 2 and 3. Sampling is of significance for both radiological and nonradiological contamination. This point was capped off in May 2001 and is routinely checked to verify that there is no discharge.

WNSP005 Generally in accordance with DOE/EH-0173T, 5.10.1.1 (previously in accordance with SPDES permit no. NY0000973)

Provides for the sampling of uncontrolled surface waters from this discrete drainage path after outfall 007 discharge into the drainage and before these waters flow into Erdman Brook. Waters represent surface and subsurface drainages primarily from the main plant yard area. Historically, this point was used to monitor sludge pond and utility room discharges to the drainage. These two sources have been rerouted. Migration of residual site contamination around the main plant dictates surveillance of this point, primarily for radiological parameters. Sr-90 and gamma-isotopic analyses were added on a quarterly basis beginning in the 2nd quarter of 2003.

WNCOOLW Generally in accordance with DOE/EH-0173T, 5.10.1.1

Operational sampling carried out to confirm that radiological contamination is not migrating into the primary coolant loop of the high-level waste treatment facility and/or plant utility steam systems. Migration from either source might indicate radiological control failure. Sampling was reduced from monthly to quarterly at the end of the 1st quarter of 2003 (March) and Sr-90 analysis was added.

n Sampling locations are shown on Figure A-2 (p. A-2).

2003 Monitoring Program
Environmental Surveillance

On-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNFRC67* *Frank's Creek East of the SDA*	Drains NYS Low-level Waste Disposal Area Reported in: • MTAR • ASER • Reported to NYSERDA	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
				Monthly samples composited to 4	Quarterly composites for gamma isotopic and Sr-90
WNERB53* *Erdman Brook North of Disposal Areas*	Drains NYS and WVDP disposal areas Reported in: • MTAR • ASER • Reported to NYSERDA	Grab liquid	Weekly	52	Gross alpha/beta, H-3, pH
				Weekly samples composited to 4	Quarterly composites for gamma isotopic and Sr-90
WNNDADR *Drainage Between NDA and SDA*	Drains WVDP disposal and storage area Reported in: • MTAR • ASER • Reported to NYSERDA	Timed continuous composite liquid	Weekly	52	pH, H-3
				Weekly samples composited to 12	Monthly composite for gross alpha/beta, gamma isotopic, H-3
				Weekly samples composited to 4	Quarterly composite for Sr-90, I-129
		Grab liquid	Weekly	52	NPOC, TOX
WNDCELD *Drainage South of Drum Cell*	Drains WVDP storage area Reported in: • MTAR • ASER • Reported to NYSERDA	Grab liquid	Monthly	12	Gross alpha/beta, pH
				Monthly samples composited to 4	Quarterly composite for H-3, Sr-90, I-129, gamma isotopic
WNNDATR** *NDA Trench Interceptor Project*	On-site groundwater interception Reported in: • MTAR • ASER	Grab liquid	Monthly	12	Gross alpha/beta, H-3, gamma isotopic, NPOC, TOX
				Monthly samples composited to 4	Quarterly composite for I-129

* Monthly sample also collected by NYSDOH
** Coordinated with Main Plant Operations

Sampling Rationale

WNFRC67 DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of both the SDA and drum cell drainage into Frank's Creek east of the SDA and upstream of its confluence with Erdman Brook. Strontium-90 and gamma isotopic analysis were added on a quarterly basis at the beginning of the 2nd quarter of 2003.

WNERB53 DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of the drainages from the SDA and the WVDP storage and disposal area into Erdman Brook upstream of its confluence with Frank's Creek. Strontium-90 and gamma isotopic analysis were added on a quarterly basis at the beginning of the 2nd quarter of 2003.

WNNDADR DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of the drainages from the SDA and the WVDP storage and disposal area into Lagoon Road Creek upstream of the creek's confluence with Erdman Brook.

WNDCELD DOE/EH-0173T, 5.10.1.1

Monitors the potential influence of drum cell drainage into Frank's Creek south of the SDA and upstream of **WNFRC67**.

WNNDATR Generally in accordance with DOE/EH-0173T, 5.10.1.1

Monitors groundwater in the vicinity of the NDA interceptor trench project. The grab sample is taken directly from the trench collection system.

n Sampling locations are shown on Figure A-2 (p. A-2).

2003 Monitoring Program
Environmental Surveillance

On-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNSTAW Series *On-Site Standing Water Ponds Not Receiving Effluent* **WNSTAW4** *Border Pond Southwest of AFRT240* **WNSTAW5** *Border Pond Southwest of DFTLD13* **WNSTAW6** *Borrow Pit Northeast of Project Facilities* **WNSTAW9** *North Reservoir Near Intake* **WNSTAWB** *Background Pond at Sprague Brook Maintenance Building*	Water within vicinity of airborne or water effluent from the plant Reported in: • MTAR • ASER	Grab liquid	Annual	1 each location*	Gross alpha/beta, H-3, Sr-90, gamma isotopic, pH, conductivity, Cl, Fe, Mn, Na, NO_3+NO_2-N, SO_4

* Sampling depends upon on-site ponding conditions during the year.

Sampling Rationale

WNSTAW Series DOE/EH-0173T, 5.10.1.1

Monitoring of on- and off-site standing waters at locations listed below. Although none receive effluent directly, the potential for contamination is present except at the background location. Former collecting sites 1,2,3,7, and 8 were deleted from the monitoring program because they were either built over or are now dry. Strontium-90 and gamma isotopic were added on an annual basis beginning in 2003.

WNSTAW4 Border pond located south of **AFRT240**. Chosen as a location for showing potentially high concentrations, based on meteorological data. This perimeter location is next to a working farm. Drainage extends through private property and is accessible by the public.

WNSTAW5 Border pond located west of Project facilities near the perimeter fence and **DFTLD13**. Chosen as a location for showing potentially high concentrations, based on meteorological data. Location is next to a private residence and potentially accessible by the general public.

WNSTAW6 Borrow pit northeast of Project facilities just outside the inner security fence. Considered the closest standing water to the main plant and high-level waste facilities.

WNSTAW9 North reservoir near intake. Chosen to provide data in the event of potentially contaminated site potable water supply. Location is south of main plant facilities.

WNSTAWB Pond located near the Sprague Brook maintenance building. Considered a background location; approximately 14 kilometers north of the WVDP.

n Sampling locations are shown on Figures A-2, A-3, and A-13 (pp. A-2, A-3, and A-13).

2003 Monitoring Program
Environmental Surveillance

On-Site Potable Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WNDNK Series *Site Potable Water* **WNDNKMS** *Maintenance Shop Drinking Water* **WNDNKMP** *Main Plant Drinking Water* **WNDNKEL** *Environmental Laboratory Drinking Water*	Sources of potable water within site perimeter Reported in: • MTAR • ASER • Also reported to Cattaraugus County	Grab liquid	Every third month (rotate sampling at WNDNKMS, WNDNKMP, WNDNKEL)	4 each location	Gross alpha/beta, H-3, pH, conductivity
		Grab liquid	Quarterly (WNDNKEL only)	4	Total haloacetic acids, total trihalomethanes, giardia, cryptosporidium, heterotrophic bacteria
WNDNKUR *Utility Room (EP-1) Potable Water Storage Tank*	Sources of potable water within site perimeter Reported in: • MTAR • ASER • Also reported to Cattaraugus County	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH, conductivity
		Grab liquid*	Annual	1	As, Ba, Be, Cd, Cr, Hg, Ni, Sb, Se, Tl, cyanide, fluoride

* Sample for NO_3 (as total nitrate) is collected by the Cattaraugus County Health Department. Pb and Cu also are sampled at this site based upon Cattaraugus County Health Department guidance.

Sampling Rationale

WNDNK Series Site drinking water; generally according to DOE/EH-0173T, 5.10.1.2; 10 NYCRR, Part 5, Subpart 5-1

Potable-water sampling to confirm no migration of radiological and/or nonradiological contamination into the site's drinking water supply. Sampling at WNDNKMS, WNDNKMP, and WNDNKEL was reduced from monthly to every third month on a rotating basis at the end of the 1st quarter of 2003.

WNDNKMS Potable water sampled at the maintenance shop in order to monitor a point that is at an intermediate distance from the point of potable water generation and that is used heavily by site personnel.

WNDNKMP Same rationale as **WNDNKMS** but sampled at the break room sink in the main plant.

WNDNKEL Potable water sampled at the Environmental Laboratory. Disinfectant by-products are sampled at WNDNKEL, the furthest location from the entry point (WNDNKUR).

WNDNKUR Sampled at the utility room potable water storage tank before the site drinking water distribution system. Sample location is entry point EP-1.

n Sampling locations are within the site facilities and are not detailed on figures.

2003 Monitoring Program
Environmental Surveillance

On-Site Groundwater

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
Low-Level Waste Treatment Facility *(SSWMU #1)* 103 104 C 105 C 106 107 108 110 111 116 U 8604 C 8605 **Miscellaneous Small Units** *(SSWMU #2)* 201 U 204 205 206 C 208 **Liquid Waste Treatment System** *(SSWMU #3)* 301 B 302 U	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • ASER • Quarterly Groundwater Reports	Grab liquid	4 times per year (generally)*	4 each well (generally)*	Gross alpha, gross beta, H-3 *
		Direct field measurement of sampled water	Each sampling event*	Twice each sampling event	Conductivity, pH

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* Sampling frequency and analytes vary from point to point. See p. E-3 for a summary listing of all monitored analytes and Table E-1 (Appendix E [p. E-4C]) for a listing of analytes monitored at each location. See Appendix EC for results from each location.

Sampling Rationale

On-Site Groundwater

DOE/EH-0173T, 5.10.1.3; 40 CFR, Parts 264 and 265, Subpart F

The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection was addressed in the "Groundwater Protection Management Program Plan," WVDP-091. Groundwater monitoring was detailed in the "Groundwater Monitoring Plan," WVDP-239.

SSWMU #1 Low-level waste treatment facilities, including four active lagoons – lagoons 2, 3, 4, and 5 – and an inactive, filled-in lagoon – lagoon 1.

SSWMU #2 Miscellaneous small units, including the sludge pond, the solvent dike, the paper incinerator, the equalization basin, and the kerosene tank.

SSWMU #3 Liquid waste treatment system containing effluent from the supernatant treatment system.

n Sampling locations are shown on Figures A-6 and A-7 (pp. A-6 and A-7).

2003 Monitoring Program
Environmental Surveillance

On-Site Groundwater

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
HLW Storage and Processing Tank *(SSWMU #4)* 401 B 402 U 403 U 405 C 406 408 409 **Maintenance Shop Leach Field** *(SSWMU #5)* 501 U 502 **Low-Level Waste Storage Area** *(SSWMU #6)* 602A 604 605 8607 U 8609 U **Chemical Process Cell Waste Storage Area** *(SSWMU #7)* 704 706 B 707 C	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • ASER • Quarterly Groundwater Reports	Grab liquid	4 times per year (generally)*	4 each well (generally)*	Gross alpha, gross beta, H-3 *
		Direct field measurement of sampled water	Each sampling event*	Twice each sampling event	Conductivity, pH

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* Sampling frequency and analytes vary from point to point. See p. E-3 for a summary listing of all monitored analytes and Table E-1 (Appendix E [p. E-4C]) for a listing of analytes monitored at each location. See Appendix EC for results from each location.

Sampling Rationale

On-Site Groundwater

DOE/EH-0173T, 5.10.1.3; 40 CFR, Parts 264 and 265, Subpart F

The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection was addressed in the "Groundwater Protection Management Program Plan," WVDP-091. Groundwater monitoring was detailed in the "Groundwater Monitoring Plan," WVDP-239.

SSWMU #4 High-level waste storage and processing area, including the high-level radioactive waste tanks, the supernatant treatment system, and the vitrification facility.

SSWMU #5 Maintenance shop sanitary leach field, formerly used by NFS and the WVDP to process domestic sewage generated by the maintenance shop.

SSWMU #6 Low-level waste storage area; includes metal and fabric structures housing low-level radioactive waste being stored for future disposal.

SSWMU #7 Chemical process cell (CPC) waste storage area, which contains packages of pipes, vessels, and debris from decontamination and cleanup of the chemical process cell in the former reprocessing plant.

n Sampling locations are shown on Figures A-6 and A-7 (pp. A-6 and A-7).

2003 Monitoring Program
Environmental Surveillance

On-Site Groundwater

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
Construction and Demolition Debris Landfill (CDDL) *(SSWMU #8)* 801 U 802 803 804 8603 U 8612 **NRC-Licensed Disposal Area (NDA)** *(SSWMU #9)* 901 U 902 U 903 906 908 U 909 910 8610 8611 NDATR **IRTS Drum Cell** *(SSWMU #10)* 1005 U 1006 1007 1008b B 1008c B	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • ASER • Quarterly Groundwater Reports	Grab liquid →	4 times per year (generally)* →	4 each well (generally)* →	Gross alpha, gross beta, H-3*
		Direct field measurement of sampled water →	Each sampling event* →	Twice each sampling event →	Conductivity, pH
Remote-Handled Waste Facility *(Not in a SSWMU)* 1301 U 1302 U 1303 1304	Groundwater monitoring points around the new RHWF** Reported in: • ASER • Quarterly Groundwater Reports	Grab liquid →	4 times per year →	4 each well →	Gross alpha, gross beta, H-3*
		Direct field measurement of sampled water →	Each sampling event →	Twice each sampling event →	Conductivity, pH

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* Sampling frequency and analytes vary from point to point. See p. E-3 for a summary listing of all monitored analytes. See Table E-1 (Appendix E [p. E-4C]) for a listing of analytes monitored at each location. See Appendix EC for results from each location.

** These wells were installed in August 2003 and sampling initiated during the fourth quarter of 2003 (September 2003).

Sampling Rationale

On-Site Groundwater	DOE/EH-0173T, 5.10.1.3; 40 CFR, Parts 264 and 265, Subpart F The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection was addressed in the "Groundwater Protection Management Program Plan," WVDP-091. Groundwater monitoring was detailed in the "Groundwater Monitoring Plan," WVDP-239.
SSWMU #8	The construction and demolition debris landfill (CDDL); used by NFS and the WVDP to dispose of nonhazardous and nonradioactive materials.
SSWMU #9	The NRC-licensed disposal area (NDA); contains radioactive wastes generated by NFS and the WVDP. The NDA is bounded on its downgradient (northwest and northeast) perimeters by the interceptor trench, which is sampled at monitoring point NDATR.
SSWMU #10	The integrated radioactive waste system (IRTS) treatment drum cell; stores cement-stablized low-level radioactive waste.
Remote-Handled Waste Facility	Establish pre-operational baseline groundwater conditions in the area of the newly constructed remote-handled waste facility (RHWF). Monitor groundwater in the vicinity of the RHWF.

n Sampling locations are shown on Figures A-6 through A-8 (pp. A-6 through A-8).

2003 Monitoring Program
Environmental Surveillance

On-Site Groundwater and Seeps

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
State-Licensed Disposal Area *(SSWMU #11)** 1101a U 1101b U 1101c U 1102a 1102b 1103a 1103b 1103c 1104a 1104b 1104c 1105a 1105b 1106a U 1106b U 1107a 1108a U 1109a U 1109b U 1110a 1111a	Groundwater monitoring points around site super solid waste management units (SSWMUs) Reported in: • ASER	Grab liquid	Semiannual	2 each well	Gross alpha/beta, H-3, pH, conductivity, turbidity
		Grab liquid	Annual	1 each well	Gamma scan, beta-emitters (C-14, Sr-90, Tc-99, I-129), VOCs
North Plateau Seeps *(Not in an SSWMU)* GSEEP SP04 SP06 SP11 SP12	Groundwater seepage points along the northeastern edge of the north plateau Reported in: • ASER • Quarterly Groundwater Reports	Grab liquid	Semiannual (Quarterly at GSEEP)	2 each seep (4 at GSEEP)	Gross alpha/beta, H-3, and VOCs at GSEEP and SP12)
		Direct field measurement of sampled water	Semiannual at SP12 (Quarterly at GSEEP)	2 at SP12 (4 at GSEEP)	pH, conductivity
Miscellaneous Well Points *(Not in an SSWMU)* WP-A WP-C WP-H **NB1S** *(Former Background Well)*	Well points down-gradient of main plant and the former sand and gravel unit background well Reported in: • ASER • Quarterly Groundwater Reports	Grab liquid	Annual (Quarterly at NB1S)	1 each well (4 at NB1S)	Gross alpha/beta, H-3
		Direct field measurement of sampled water	Annual (Quarterly at NB1S)	1 each well (4 at NB1S)	pH, conductivity

NOTE: "U" designates upgradient, "B" designates background, and "C" designates crossgradient wells. The remainder are downgradient.

* SSWMU #11 is sampled by NYSERDA under a separate program.

Sampling Rationale

On-Site Groundwater	DOE/EH-0173T, 5.10.1.3; 40 CFR, Parts 264 and 265, Subpart F The on-site WVDP groundwater monitoring program provides for the determination of water quality, focusing on radiological and chemical surveillance of both active and inactive super solid waste management units (SSWMUs). In addition, using wells situated hydraulically upgradient (background) and downgradient of SSWMUs allows both detection of groundwater contamination and evaluation of the effects associated with the individual SSWMUs. Groundwater protection was addressed in the "Groundwater Protection Management Program Plan," WVDP-091. Groundwater monitoring was detailed in the "Groundwater Monitoring Plan," WVDP-239.
SSWMU #11	The New York State-licensed disposal area (SDA) was operated by NFS as a commercial low-level disposal facility; it also received wastes from NFS reprocessing operations.
North Plateau Seeps	Monitor groundwater emanating from the ground surface along the edge of the site's north plateau.
Well Points	Monitor groundwater of known subsurface contamination in the north plateau area. All well points are downgradient of the main plant.
WNWNB1S	Former background well on the north plateau.

n Sampling locations are shown on Figures A-6 through A-8 (pp. A-6 through A-8).

2003 Monitoring Program
Environmental Surveillance

Off-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WFBCBKG* *Buttermilk Creek Near Fox Valley (Background)*	Unrestricted surface water, background Reported in: • MTAR • ASER • Reported to NYSERDA	Timed continuous composite liquid	Weekly	52 weekly samples composited to 12	Monthly composite for gross alpha/beta, H-3
				Weekly samples composited to 4	Quarterly composite for gamma isotopic, C-14, Sr-90, Tc-99, I-129, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Grab liquid	Monthly	12	Hardness (Ca and Mg)
		Grab liquid	Semiannual**	2	Temperature (field), pH (field), dissolved oxygen (field), TOX, oil and grease
		24-hour timed continuous composite	Semiannual**	2	TSS, TDS, NPOC, NH_3 (as N), NO_3 (as N), NO_2 (as N), bromide, fluoride, chloride, sulfate, total sulfide, surfactant (as LAS), alpha-BHC, B, Ba, Co, Fe, Na, Mn, Sb, Ti, Tl, V, dissolved Al, As, Cd, Cr, Cu, Hg (method 1631), Ni, Pb, Se, Zn
WFBCTCB* *Buttermilk Creek Upstream of Confluence With Cattaraugus Creek at Thomas Corners Road*	Restricted surface waters receiving plant effluents Reported in: • MTAR • ASER	Timed continuous composite liquid	Weekly	52 weekly samples composited to 12	Monthly composite for gross alpha/beta, H-3
				Weekly samples composited to 4	Quarterly composite for gamma isotopic, Sr-90, Tc-99
		Grab liquid	Monthly	12	Hardness (Ca and Mg)
		Grab liquid	Semiannual**	2	Temperature (field), pH (field), dissolved oxygen (field), TOX, oil and grease
		24-hour timed continuous composite	Semiannual**	2	TSS, TDS, NPOC, NH_3 (as N), NO_3 (as N), NO_2 (as N), bromide, fluoride, chloride, sulfate, total sulfide, surfactant (as LAS), alpha-BHC, B, Ba, Co, Fe, Na, Mn, Sb, Ti, Tl, V, dissolved Al, As, Cd, Cr, Cu, Hg (method 1631), Ni, Pb, Se, Zn

* Monthly composites are also sent to NYSDOH.
** Semiannual samples collected when points WNSP001 and WNSP007 are discharging.

Sampling Rationale

WFBCBKG DOE/EH-0173T, 5.10.1.1; 6 NYCRR, Part 702–704

Monitors background conditions of Buttermilk Creek upstream of the WVDP; allows for comparison to downstream conditions. Monitoring for nonradiological parameters performed during discharges from WNSP001 and WNSP007 for comparison with downstream conditions.

The parameter list for nonradiological analyses was modified in 2003 from a groundwater-oriented program to a surface-water-oriented program. Analyses were added to ensure compliance with New York State Water Quality Standards for Class C Waters.

The monitoring program on the facing page was put into effect at the end of the 1st quarter of 2003, in March.

WFBCTCB DOE/EH-0173T, 5.10.1.1; 6 NYCRR, Part 702–704

Buttermilk Creek is the surface water that receives all WVDP effluents. **WFBCTCB** monitors the potential influence of WVDP drainage into Buttermilk Creek upstream of Buttermilk Creek's confluence with Cattaraugus Creek. Monitoring for nonradiological parameters performed during discharges from WNSP001 and WNSP007 for comparison with New York State ambient water quality standards (6 NYCRR, Part 702–704).

The parameter list for nonradiological analyses was modified in 2003 from a groundwater-oriented program to a surface-water-oriented program. Analyses were added to ensure compliance with New York State Water Quality Standards for Class C Waters.

Technetium-99 analysis was added on a quarterly basis at the beginning of the 2nd quarter of 2003.

The monitoring program on the facing page was put into effect at the end of the 1st quarter of 2003, in March.

n Sampling locations are shown on Figure A-3 (p. A-3).

2003 Monitoring Program
Environmental Surveillance

Off-Site Surface Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WFBIGBR *Cattaraugus Creek at Bigelow Bridge (Background)*	Unrestricted surface water, background Reported in: • MTAR • ASER	Grab liquid	→ Monthly	→ 12	→ Gross alpha/beta, H-3, Sr-90, gamma isotopic, pH
WFFELBR* *Cattaraugus Creek at Felton Bridge*	Unrestricted surface waters receiving plant effluents Reported in: • MTAR • ASER	Timed continuous composite liquid	→ Weekly	→ 52	→ Gross alpha/beta, H-3, pH
				Weekly samples composited to 12	→ Flow-weighted monthly composite for gross alpha/beta, H-3, Sr-90, and gamma isotopic
				Weekly samples composited to 4	→ Quarterly composite for Tc-99

* Monthly composites are also sent to NYSDOH.

Sampling Rationale

WFBIGBR DOE/EH-0173T, 5.10.1.1

Monitors background conditions of Cattaraugus Creek at Bigelow Bridge, upstream of the WVDP; allows for comparison to downstream conditions.

WFFELBR DOE/EH-0173T, 5.10.1.1

Because Buttermilk Creek empties into Cattaraugus Creek, **WFFELBR** monitors the potential influence of WVDP drainage into Cattaraugus Creek directly downstream of the Cattaraugus Creek confluence with Buttermilk Creek.

Technetium-99 analysis was added on a quarterly basis at the beginning of the 2nd quarter of 2003.

n Sampling locations are shown on Figure A-3 (p. A-3).

2003 Monitoring Program
Environmental Surveillance

Off-Site Drinking Water

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
WFWEL Series: *Wells Outside the WNYNSC Perimeter But Near the WVDP* **WFWEL01** *3.0 km West-Northwest* **WFWEL02** *1.5 km Northwest* **WFWEL03** *3.5 km Northwest* **WFWEL04** *3.0 km Northwest* **WFWEL05** *2.5 km Southwest* **WFWEL06** *(Background) 29 km South* **WFWEL07** *4.4 km North-Northeast* **WFWEL08** *2.5 km East-Northeast* **WFWEL09** *3.0 km Southeast* **WFWEL10** *7.0 km North*	Drinking water supply; groundwater near facility* Reported in: • MTAR • ASER	Grab liquid	→ Annual	→ 1 each location	→ Gross alpha/beta, H-3, Sr-90, gamma isotopic, pH, conductivity

* No drinking water wells are located in hydrogeological units affected by site activity.

Sampling Rationale

Off-Site Drinking Water WFWEL Series

DOE/EH-0173T, 5.10.1.2

Eight of the ten listed off-site private residential drinking water wells represent the nearest unrestricted uses of groundwater close to the WVDP. The ninth sample (**WFWEL10**) is taken from a public water supply from deep wells. The tenth drinking water well, **WFWEL06**, is located 29 kilometers south of the Project and is considered a background drinking water source.

Strontium-90 analysis was added on an annual basis during 2003.

n Sampling locations are shown on Figures A-9, A-12, and A-13 (pp. A-9, A-12, and A-13).

2003 Monitoring Program
Environmental Surveillance

Off-Site Air

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
AFFXVRD *3.0 km South-Southeast at Fox Valley* **AFTCORD** *3.7 km North-Northwest at Thomas Corners Road* **AFRT240*** *2.0 km Northeast on Route 240* **AFSPRVL** *9.4 km North at Springville* **AFWEVAL** *6.2 km South-Southeast at West Valley* **AFNASHV** *39.8 km West at Village of Nashville, Town of Hanover (Background)* **AFBOEHN** *2.3 km Southwest on Dutch Hill Road* **AFRSPRD** *1.5 km Northwest on Rock Springs Road* **AFGRVAL** *30.9 km South at Great Valley (Background)* **AFBLKST** *Bulk Storage Warehouse 2.2 km East-Southeast at Buttermilk Road*	Air samples around WNYNSC perimeter and background Reported in: • MTAR • ASER	Continuous air particulate filter	Weekly	52 each location	Gross alpha/beta, flow
				Weekly filters composited to 4 each location	Quarterly composite for Sr-90, gamma isotopic, flow In addition, quarterly composite at **AFRSPRD** and **AFGRVAL** for U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
		Continuous desiccant column for water vapor collection at **AFRSPRD** and **AFGRVAL**	Weekly	52 each location	H-3, flow
		Continuous charcoal cartridge at **AFRSPRD** and **AFGRVAL**	Monthly	12 composited to 4 each location	Quarterly composite for I-129

* Filter from duplicate sampler sent to NYSDOH.

Sampling Rationale

AFFXVRD DOE/EH-0173T, 5.7.4

AFTCORD

AFRT240 Air samplers put into service by NFS as part of the site's original monitoring program at perimeter locations chosen to obtain data from places most likely to provide highest concentrations. Choice of location based on meteorological data.

AFSPRVL DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler located on private property in a nearby community within 15 kilometers of the site (north).

AFWEVAL DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler located in a nearby community within 15 kilometers of the site (southeast).

AFNASHV DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler considered representative of natural background radiation. Located 39.8 kilometers west of the site (upwind) on privately owned property.

Sampling at this location was discontinued after the 1st quarter of 2003 (March).

AFBOEHN DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Perimeter location chosen to obtain data from the place most likely to provide the highest elevated release concentrations. **AFBOEHN** is located on NYSERDA property at the perimeter. Choice of location based on meteorological data.

AFRSPRD DOE/EH-0173T, 5.7.4

Perimeter location chosen to obtain data from the place most likely to provide the highest ground-level release concentrations. **AFRSPRD** is on WNYNSC property outside the main plant operations fenceline. H-3 and I-129 are sampled here because the sampling trains were easy to incorporate and the location was most likely to receive effluent releases. Choice of location based on meteorological data.

AFGRVAL DOE/EH-0173T, 5.7.4; DOE/EP-0023, 4.2.3

Off-site (remote) sampler considered representative of natural background radiation. Located on privately owned property 30.9 kilometers south of the site (typically upwind). H-3 and I-129 sampled here also.

AFBLKST DOE/EH-0173T, 5.7.4

Off-site monitoring of bulk storage warehouse, near the site perimeter.

n Sampling locations are shown on Figures A-5, A-12, and A-13 (pp. A-5, A-12, and A-13).

2003 Monitoring Program
Environmental Surveillance

Fallout, Sediment, and Soil

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
AFDHFOP *2.3 km Southwest* **AFFXFOP** *3.0 km South-Southeast* **AFTCFOP** *3.7 km North-Northwest* **AF24FOP** *2.0 km Northeast* **ANRGFOP** *Rain Gauge On-Site*	Collection of fallout particulates and precipitation around the WNYNSC perimeter Reported in: • MTAR • ASER	Integrated precipitation →	Monthly →	12 each location →	Gross alpha/beta, H-3, pH, gamma isotopic, volume
SF Soil Series *Surface Soil at Each of 9 Air Samplers*	Long-term fallout accumulation Reported in: • MTAR • ASER	Surface plug composite soil →	Annual →	1 each location →	Gross alpha/beta, gamma isotopic, Sr-90, Pu-238, Pu-239/240, Am-241 In addition at **SFRSPRD**, **SFBOEHN**, and **SFGRVAL**: U-232, U-233/234, U-235/236, U-238, and total U
SFCCSED *Cattaraugus Creek at Felton Bridge* **SFSDSED** *Cattaraugus Creek at Springville Dam* **SFBISED** *Cattaraugus Creek at Bigelow Bridge (Background)* **SFTCSED** *Buttermilk Creek at Thomas Corners Road* **SFBCSED** *Buttermilk Creek at Fox Valley Road (Background)*	Deposition in sediment downstream of facility effluents Reported in: • MTAR • ASER	Grab stream sediment →	Annual (Split **SFSDSED** and **SFBCSED** with NYSDOH) →	1 each location →	Gross alpha/beta, gamma isotopic, Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, Am-241
SN On-Site Soil Series: **SNSW74A** *(Near WNSW74A)* **SNSWAMP** *(Near WNSWAMP)* **SNSP006** *(Near WNSP006)*	Surface soil corresponding to site drainage paths may be partially composed of sediments. Reported in: • MTAR • ASER	Surface plug or grab →	Annual →	1 each location →	Gross alpha/beta, gamma isotopic, Sr-90, U-232, U-233/234, U-235/236, U-238, total U, Pu-238, Pu-239/240, and Am-241, Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn

Sampling Rationale

AFDHFOP
AFFXFOP
AFTCFOP
AF24FOP

DOE/EP-0023, 4.7

Collection of fallout particles and precipitation around the site perimeter at established air sampling locations: **AFDHFOP** (Dutch Hill at Boehn Road), **AFFXFOP** (Fox Valley Road), **AFTCFOP** (Thomas Corners), **AF24FOP** (Route 240). Indicates short-term effects.

ANRGFOP

Fallout particles and precipitation collected on-site by the Environmental Laboratory at the rain gauge. Indicates short-term effects.

SF Soil Series

DOE/EH-0173T, 5.9.1

Off-site soils collected at air sampling locations: **SFWEVAL** (West Valley), **SFFXVRD** (Fox Valley Road), **SFSPRVL** (Springville), **SFTCORD** (Thomas Corners), **SFRT240** (Route 240), **SFBOEHN** (Boehn Road-Dutch Hill), **SFGRVAL** (Great Valley), **SFRSPRD** (Rock Springs Road), and **SFBLKST** (bulk storage warehouse): Collection of long-term fallout data at established air sampler locations via soil sampling.

SFCCSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Cattaraugus Creek at Felton Bridge. Location is the first point of public access to Cattaraugus Creek downstream of its confluence with Buttermilk Creek.

SFSDSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Cattaraugus Creek at Springville Dam. Reservoir provides ideal settling and collection location for sediments downstream of the Buttermilk Creek confluence with Cattaraugus Creek. Located downstream of **SFCCSED**.

SFBISED

DOE/EH-0173T, 5.12.1

Sediment deposition in Cattaraugus Creek at Bigelow Bridge. Location is upstream of the Buttermilk Creek confluence with Cattaraugus Creek and serves as the Cattaraugus Creek background location.

SFTCSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Buttermilk Creek at Thomas Corners immediately downstream of all facility liquid effluents.

SFBCSED

DOE/EH-0173T, 5.12.1

Sediment deposition in Buttermilk Creek upsteam of facility effluents (background).

SN Soil Series

DOE/EH-0173T, 5.9.1.

On-site soil. (Samples may be partially composed of sediments.) **SNSW74A** (surface soil near **WNSW74A**), **SNSWAMP** (surface soil near **WNSWAMP**), and **SNSP006** (surface soil near **WNSP006**): Locations to be specifically defined by geographic coordinates. Correspond to site drainage pattern flows (i.e., most likely area of radiological deposition/accumulation).

n Sampling locations are shown on Figures A-2 through A-5, A-12, and A-13 (pp. A-2 through A-5, A-12, and A-13).

2003 Monitoring Program
Environmental Surveillance

Off-Site Biological

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
BFFCATC *Fish From Cattaraugus Creek Downstream of Its Confluence With Buttermilk Creek* **BFFCATD** *Fish From Cattaraugus Creek Downstream of the Springville Dam* **BFFCTRL** *Control Fish Sample From Nearby Stream Not Affected by the WVDP (7 km or More Upstream of Site Effluent Point; Background)*	Fish in waters up- and downstream of facility effluents Reported in: • MTAR • ASER	Individual collection, biological	→ Semiannual (samples at **BFFCATC** and **BFFCTRL** shared with NYSDOH)	→ 10 fish each location	→ Gamma isotopic and Sr-90 in edible portions of each individual fish, % moisture
			Annual (**BFFCATD** only)	→ 10 fish	→ Gamma isotopic and Sr-90 in edible portions of each individual fish, % moisture
BFMREED *Dairy Farm 3.8 km North-Northwest* **BFMCTLS** *Control Location 25 km South (Background)* **BFMCTLN** *Control Location 30 km North (Background)*	Milk from animals foraging at locations near the facility perimeter and at background sites Reported in: • MTAR • ASER	Grab biological	→ Monthly (samples at **BFMREED** shared with NYSDOH)	→ 12 monthly samples composited to 4 each location	→ Quarterly composite for gamma isotopic, H-3, Sr-90, and I-129
BFMWIDR *Dairy Farm 3.0 km Southeast* **BFMSCHT** *Dairy Farm 4.8 km South*	Milk from animals foraging near the site perimeter Reported in: • MTAR • ASER	Grab biological	→ Annual	→ 1 each location	→ Gamma isotopic, H-3, Sr-90, and I-129

Sampling Rationale

BFFCATC
BFTCATD

DOE/EH-0173T, 5.11.1.1

Radioactivity may enter a food chain in which fish are a major component and are consumed by the local population.

BFFCTRL Control fish sample; provides background data for comparison with data from fish caught downstream of facility effluents.

BFMREED
BFMCTLS
BFMCTLN
BFMWIDR
BFMSCHT

DOE/EH-0173T, 5.8.2.1

Milk is consumed by all age groups and is frequently the most important food that could contribute to the radiation dose. Dairy animals pastured near the site allow adequate monitoring. Control milk samples are collected far from the site to provide background data for comparison with data from near-site milk samples. Sampling at the northern background location (BFMCTLN) was discontinued at the end of the 1st quarter of 2003, in March.

n Sampling locations are shown on Figures A-9, A-12, and A-13 (pp. A-9, A-12, and A-13).

2003 Monitoring Program
Environmental Surveillance

Off-Site Biological

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
BFVNEAR* *Nearby Locations* **BFVCTRL*** *Remote Locations (16 km or More From Facility; Background)*	Fruit and vegetables grown near facility perimeter, downwind if possible, and at background locations Reported in: • MTAR • ASER	Grab biological (fruits and vegetables)	Annual (at harvest)	3 each (split with NYSDOH)	Gamma isotopic and Sr-90 analysis of edible portions, H-3 in free moisture, % moisture
BFBNEAR *Beef Animal From Nearby Farm in Downwind Direction* **BFBCTRL** *Beef Animal From Control Location 16 km or More From Facility (Background)*	Meat (beef foraging near facility perimeter, downwind if possible, and a background location) Reported in: • MTAR • ASER	Grab biological	Semiannual	2 each location	Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture, % moisture
BFDNEAR *Deer in Vicinity of the Site* **BFDCTRL** *Control Deer 16 km or More From the Facility (Background)*	Venison (deer foraging near facility perimeter and at background locations) Reported in: • MTAR • ASER	Individual collection, biological	Annual, during hunting season (**BFDNEAR** sample split with NYSDOH)	3	Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture, % moisture
			During year as available (**BFDCTRL** sample split with NYSDOH)	3	Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture, % moisture

* Near-site and control corn, apple, and bean samples are identified specifically as follows: corn = **BFVNEAC** and **BFVCTRC**; apples = **BFVNEAAF** and **BFVCTRA**; beans = **BFVNEAB** and **BFVCTRB**.

Sampling Rationale

BFVNEAR DOE/EH-0173T, 5.8.2.2

Fruits and vegetables (corn, apples, and beans or leafy vegetables, if available) collected from areas near the site. These samples are collected, if possible, from areas near the site predicted to have worst-case downwind concentrations of radionuclides in air and soil. Sample analysis reflects steady state/chronic uptake or contamination of foodstuffs as a result of site activities. Possible pathway directly to humans or indirectly through animals.

BFVCTRL DOE/EH-0173T, 5.8.2.2

Fruits and vegetables collected from an area remote from the site. Background fruits and vegetables collected for comparison with near-site samples. Collected in area(s) of no possible site effects.

BFBNEAR DOE/EH-0173T, 5.8.2.3

Beef collected from animals raised near the site and foraging downwind of the site in areas of maximum probable effects. Following the rationale for vegetable matter collected near the site (**BFVNEAR**), edible flesh portion of beef animals is analyzed to determine possible radionuclide content passable directly to humans.

BFBCTRL DOE/EH-0173T, 5.8.2.3

Beef collected from animals raised far from the site. Background beef collected for comparison with near-site samples. Collected in area(s) of no possible site effects.

BFDNEAR DOE/EH-0173T, 5.8.3

Venison from near-site deer. Samples are taken from deer killed in collisions with vehicles. Sample rationale is similar to **BFBNEAR**.

BFDCTRL DOE/EH-0173T, 5.8.3

Venison from deer living far from the site. Background deer meat collected for comparison with near-site samples. Collected in area(s) of no possible site effects.

n Sampling locations are shown on Figures A-9, A-12, and A-13 (pp. A-9, A-12, and A-13).

2003 Monitoring Program
Environmental Surveillance

Off-Site Direct Radiation

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
DFTLD Series *Thermoluminescent Dosimetry (TLD) Off-Site:* **#1-#16** *Each of 16 Compass Sectors at Nearest Accessible Perimeter Point* **#17** *"5 points" Landfill 19.6 km Southwest (Background)* **#20** *1,500 m Northwest (Downwind Receptor)* **#21** *Springville 9.4 km North* **#22** *West Valley 6.2 km South-Southeast* **#23** *Great Valley 30.9 km South (Background)* **#37** *Nashville 39.8 km Northwest (Background)* **#41** *Sardinia-Savage Road 15.5 km Northeast (Background)*	Direct radiation around facility Reported in: • MTAR • ASER	Integrating TLD	→ Quarterly	→ TLD cards at each of 23 locations collected 4 times per year	→ Quarterly gamma radiation exposure

Sampling Rationale

Direct Radiation Off-Site

DOE/EH-0173T, 5.5; DOE/EP-0023, 4.6.3

TLDs offer continuous integrated environmental gamma-ray monitoring and have been deployed systematically about the site. Off-site TLDs are used to verify that site activities have not adversely affected the surrounding environs.

An annual high-pressure ion chamber (HPIC) gamma radiation measurement was completed at all locations in order to confirm TLD measurements.

Sampling at redundant background locations #17, #37, and #41 was discontinued in March 2003.

n Sampling locations are shown on Figures A-11 through A-13 (pp. A-11 through A-13).

2003 Monitoring Program
Environmental Surveillance

On-Site Direct Radiation

Sample Location Code	Monitoring/Reporting Requirements	Sampling Type/Medium	Collection Frequency	Total Annual Sample Collections	Analyses Performed/ Composite Frequency
DNTLD Series *Thermoluminescent Dosimetry (TLD) On-Site:* **#18, #19, #33** *At Three Corners of the SDA* **#24, #26-#32, #34** *9 TLDS at the Security Fence Around the Site* **#35, #36, #38-#40** *5 TLDs On-Site Near Operational Areas* **#25** *Rock Springs Road 500 m North-Northwest of the Plant* **#42** *SDA T-1 Building* **#43** *SDA west Perimeter Fence*	Direct radiation around facility Reported in: • MTAR • ASER	Integrating TLD	→ Quarterly	→ TLD cards at each of 20 locations collected 4 times per year	→ Quarterly gamma radiation exposure

Sampling Rationale

Direct Radiation On-Site

DOE/EH-0173T, 5.4 and 5.5

On-site TLDs monitor waste management units and verify that the potential dose rate to the general public (i.e., at Rock Springs Road) is below 100 mrem/year (1 mSv/year) from site activities.

An annual high-pressure ion chamber (HPIC) gamma radiation measurement is completed at all locations in order to confirm TLD measurements.

Potential TLD sampling locations are continually evaluated with respect to site activities.

n Sampling locations are shown on Figure A-10 (p. A-10).

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